

REMARKS

In the previous non-final Office Action dated July 6, 2007, the Examiner stated that certain claims, 4-11, 16, 18-24, would be allowable if rewritten in independent form. Relying on the Examiner's statements, Applicant amended the claims as suggested. To Applicant's dismay, he received yet another Office Action despite the Examiner's statement that such would be allowable. Applicant again fully cooperates with the Examiner's request and further amends the claims. Applicant would appreciate the Examiner's efforts to expedite the prosecution of the application as well.

In the present amendment, claims 1, 4, 10, and 27-32 are amended, and claims 5, 13-14, 16, and 25-26 are cancelled. Thus, claims 1-4, 6-12, 15, 17-24, and 27-32 are currently pending and being examined. The amendments to the claims are fully supported by the original claims and specification. For example, the amendments to the claims are supported by original specification – paragraph [0044-46] (selection based on differences in timing of female development) of the Patent Application as published, Publication No. 20040168216 and Example 5, "Quantifying Divergence in Female Development Schedules, paragraphs [0084-87]. No new matter has been added. Entry of the amendments at this time is therefore respectfully requested. Applicant reserves the right to pursue any of the cancelled claims in one or more continuation applications.

Claims 1-3, 12, 15, and 17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Lutts et al. (Euphytica 78: 19-25, 1994) in view of Ogburia et al. (Euphytica 88: 9-16, 1996) and further in view of Bashaw et al. (Apomictic grasses, *In* Principles of cultivar development, Volume 2, pages 41-83, 1987) for the reasons set forth in pages 2-3 of the Office Action.

Presently pending independent claim 1 is directed to method of producing an apomictic plant from sexual plants. The method requires the step of: (a) quantifying divergence in female developmental schedules of plants from an angiospermous plant species, genus, or family, including collecting data comprising the meiotic or embryo sac development stage, pistil length and width, inner and outer integument lengths, and meiocyte or embryo sac length and width; and further requires the step of (b) identifying and selecting a first and second sexual plant from an angiospermous plant species, genus, or family based on differences in the timing of female developmental schedules quantified in step (a), wherein the initiation time of embryo sac formation in the first plant occurs at about the same time as or before megasporogenesis in the

second plant relative to the developmental maturity of the nongametophytic ovule and ovary tissues, wherein the nongametophytic ovule and ovary tissues comprise at least one member of the group consisting of nucellus, integument, pericarp, hypanthium, and pistil wall, such that a hybrid of the first and second sexual plant would result in asynchronous female development.

Applicant's invention is based on the surprising discovery that apomixis is a result of asynchronous expression of female developmental programs induced by hybridizing reproductively divergent lines. Applicant's presently claimed invention focuses on this surprising discovery. None of the prior art cited by the Examiner teaches or even suggests the concept of asynchronous expression of duplicate female reproductive genes. More specifically, none of the prior art teach the step of quantifying divergence in female developmental schedules of plants from an angiospermous plant species, genus, or family, including collecting data comprising the meiotic or embryo sac development stage, pistil length and width, inner and outer integument lengths, and meiocyte or embryo sac length and width; or the step of identifying and selecting a first and second sexual plant from an angiospermous plant species, genus, or family based on differences in the timing of female developmental schedules quantified in step (a), wherein the initiation time of embryo sac formation in the first plant occurs at about the same time as or before meiosis in the second plant relative to the developmental maturity of the nongametophytic ovule and ovary tissues, wherein the nongametophytic ovule and ovary tissues comprise at least one member of the group consisting of nucellus, integument, pericarp, hypanthium, and pistil wall, such that a hybrid of the first and second sexual plant would result in asynchronous female development.

These claim steps are at the heart of Applicant's invention and allow for the successful production of apomictic plants from sexual parent plants. Lutts fails to teach these critical steps. There is no teaching or suggestion in Lutts of the steps of quantifying asynchronous female developmental divergence and then selecting the plants to hybridize based on the divergence. Ogburia et al. and Bashaw both also fail to teach these critical steps. Thus, Lutts alone, or in view of Ogburia et al., and/or Bashaw cannot make the presently claimed invention obvious as a matter of law. Applicant therefore respectfully requests that this rejection be withdrawn.

Claim 1-3, 12, 15, and 17 were rejected under 35 U.S.C. 103(a) as being unpatentable over Bashaw (Apomixis in crop improvement. *In Hybridization of crop plants*. 1980. pages 45-

63), in view of Dujardin et al. (Euphytica 38: 229-235, 1988) for the reasons set forth in pages 5-6 of the Office Action.

As stated above, in contrast to the prior art, Applicant was the first to discover and teach that apomixis is not caused by one or two apomixis genes, but in fact is caused by the asynchronous expression of many duplicate genes regulating meiosis and seed development, leading to the presently claimed method.

Again, presently pending independent claim 1 is directed to method of producing an apomictic plant from sexual plants. The method requires the step of: (a) quantifying divergence in female developmental schedules of plants from an angiospermous plant species, genus, or family, including collecting data comprising the meiotic or embryo sac development stage, pistil length and width, inner and outer integument lengths, and meiocyte or embryo sac length and width; and further requires the step of (b) identifying and selecting a first and second sexual plant from an angiospermous plant species, genus, or family based on differences in the timing of female developmental schedules quantified in step (a), wherein the initiation time of embryo sac formation in the first plant occurs at about the same time as or before megasporogenesis in the second plant relative to the developmental maturity of the nongametophytic ovule and ovary tissues, wherein the nongametophytic ovule and ovary tissues comprise at least one member of the group consisting of nucellus, integument, pericarp, hypanthium, and pistil wall, such that a hybrid of the first and second sexual plant would result in asynchronous female development.

Applicant's presently claimed invention focuses on Applicant's surprising discovery of use of asynchronous female developmental genes to induce apomixis in a plant. Bashaw and Dujardin fail to teach or suggest the step of quantifying divergence in female developmental schedules of plants from an angiospermous plant species, genus, or family, including collecting data comprising the meiotic or embryo sac development stage, pistil length and width, inner and outer integument lengths, and meiocyte or embryo sac length and width. Bashaw and Dujardin also fail to teach or suggest the step of identifying and selecting a first and second sexual plant from an angiospermous plant species, genus, or family based on differences in the timing of female developmental schedules quantified in step (a), wherein the initiation time of embryo sac formation in the first plant occurs at about the same time as or before megasporogenesis in the second plant relative to the developmental maturity of the nongametophytic ovule and ovary tissues, wherein the nongametophytic ovule and ovary tissues comprise at least one member of

the group consisting of nucellus, integument, pericarp, hypanthium, and pistil wall, such that a hybrid of the first and second sexual plant would result in asynchronous female development.

Thus, Bashaw and Dujardin, alone or in combination cannot make the presently claimed invention obvious. Applicant therefore respectfully requests that this rejection be withdrawn.

Claims 1-4, 6-12, 15, 17-24, 27-32 were rejected under 35 U.S.C. 103(a) over Lutts et al. (Euphytica 78: 19-25, 1994) in view of Ogburia et al. (Euphytica 88: 9-16, 1996) and further in view of Koul et al. (Euphytica 28:457-464, 1979), Hussey et al. (Euphytica 54:141-145, 1991), Hanna et al. (Crop Sci. 27:1136-1139, 1987), and Kroon et al. (Euphytica 23:345-354, 1974) for the reasons set forth in pages 4-6 of the Office Action.

As stated thoroughly above, Lutts and Ogburia fail to teach the step of quantifying divergence in female developmental schedules of plants from an angiospermous plant species, genus, or family and further fail to teach or suggest the step of identifying and selecting a first and second sexual plant from an angiospermous plant species, genus, or family based on differences in the timing of female developmental schedules quantified in step (a), wherein the initiation time of embryo sac formation in the first plant occurs at about the same time as or before megasporogenesis in the second plant relative to the developmental maturity of the nongametophytic ovule and ovary tissues, wherein the nongametophytic ovule and ovary tissues comprise at least one member of the group consisting of nucellus, integument, pericarp, hypanthium, and pistil wall.

The additional references of Koul et al.; Hussey et al., Hanna et al., and Kroon et al. do nothing to remedy the deficiencies of Lutts and Ogburia. None of the references teach the steps of quantifying divergence in female developmental schedules of plants from an angiospermous plant species, genus, or family, including collecting data comprising the meiotic or embryo sac development stage, pistil length and width, inner and outer integument lengths, and meiocyte or embryo sac length and width and further fail to teach or suggest the step of identifying and selecting a first and second sexual plant from an angiospermous plant species, genus, or family based on differences in the timing of female developmental schedules quantified in step (a).

Again, without these teachings the presently claimed invention cannot be found obvious without the use of hindsight. The federal circuit has warned against the use of hindsight. The court states, "[i]t is difficult but necessary that the decisionmaker forget what he or she has been taught . . . about the claimed invention and cast the mind back to the time the invention was

made (often as here many years), to occupy the mind of one skilled in the art. " W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303, 313 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). Therefore, Applicant respectfully requests that this rejection be withdrawn.

In view of the above amendments and arguments, Applicant now believes all claims to be in condition for allowance. If there are any questions, the Examiner is invited to call Applicant's representative Rodney Fuller at (602) 916-5404 to resolve any remaining issues to expedite the allowance of this application.

Respectfully submitted,

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Date

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